



## HYDRO at waverley

AQUATIC PHYSIOTHERAPY

### What are the Physiological benefits of Aquatic Physiotherapy?

Aquatic physiotherapy has profound physiological effects. These effects are both immediate and delayed, and they allow water to be used with therapeutic efficacy for a great variety of rehabilitative problems. Nearly all of these physiological effects are related to the fundamental principles of hydrodynamics.

**Water pressure:** When the body is immersed in water during aquatic physiotherapy it applies a pressure on the body which aids in the resolution of edema and reduces the swelling in an injured body part.

**Buoyancy:** Immersed objects have less apparent weight than the same object on land due to buoyancy, which results from the upward force generated by the volume of water displaced. Thus water can be used to advantage in the management of medical problems which restrict weight bearing. As the body is gradually immersed, water is displaced, creating the force of buoyancy. This takes weight off the immersed joints progressively.

**Viscosity:** Is a property that makes water a useful strengthening medium. Viscous resistance increases as more force is exerted against it, but resistance drops to almost zero immediately on cessation of force. Thus, when a rehabilitating person feels pain and stops the movement, the force drops precipitously and water damps the movement almost instantly. This allows great control of strengthening activities within the range of patient comfort.

**Increased Venous Return:** Our venous system is very sensitive to external pressure changes, including compression from surrounding muscles and particularly from external water pressure. Because of this, the water pressure during Aquatic Physiotherapy is greater than venous pressure. This helps blood to be displaced upward through this one-way system, first into the thighs, then into the abdominal cavity vessels, and finally into the great vessels of the chest cavity and into the heart.

**Increased Pulmonary Function:** Our lungs are profoundly affected by immersion of the body to the level of the thorax. Part of the effect is due to the shifting of blood into the chest cavity, and part is due to compression of the chest wall itself by the water. The combined effect is to alter pulmonary function, increase the work of breathing, and change respiratory dynamics.

**Maintaining the Musculoskeletal system:** Our musculoskeletal system also benefits from the compression caused by aquatic immersion. During immersion cardiac output is increased which is then predominantly redistributed to the skin and muscle rather than to the splanchnic beds. Resting muscle blood flow has similarly been found to increase, along with an increase in oxygen and blood glucose delivery to muscles and an increased circulatory drive which helps remove muscle metabolic waste products. These beneficial effects are produced both in normal muscle during exercise and in muscle and ligament structures during healing.

**Renal System:** Aquatic immersion has been shown to promote the excretion of metabolic waste products; assist in the regulation of sodium, potassium, and water; and generally lower blood pressure. The renal effects persist longer than the period of immersion, often lasting many hours or even days.

**Pain perception:** Water immersion has a relaxation effect that influences pain perception. Skin sensor nerve endings are affected, including temperature, touch, and pressure receptors. Sensory overflow has been suggested to be the mechanism by which pain is less well perceived when the affected body part is immersed in water.